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(54) Elevator machine room and procedure for installing it.

(57) The invention relates to a machine room module for an elevator and to a procedure for installing it above the elevator shaft. According to the invention, the various pieces of equipment carried by the base (2) of the machine room module are fixedly mounted in their proper positions as required by the elevator construction, and the base (2) is provided at least with supporting elements (20,26, 36) to support the base and to fix it on top of the elevator shaft (40). The module as a whole is positioned in the correct place in a horizontal plane above the shaft by means of positioning devices (38).

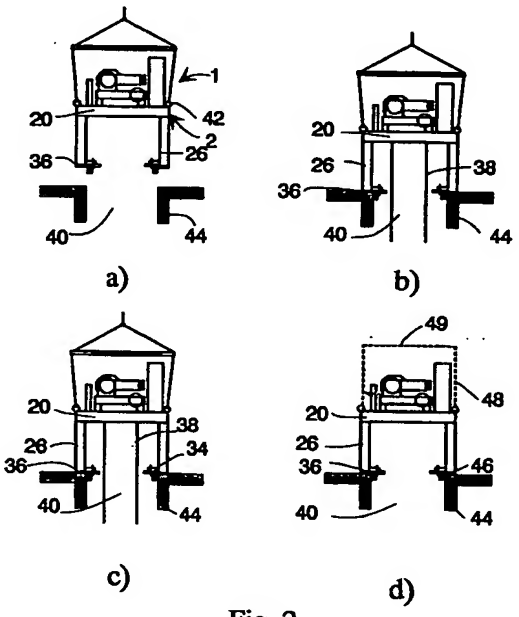

Fig. 2

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The present invention relates to an arrangement for the installation of the machine room of an elevator as defined in the preamble of claim 1 and to a procedure for installing the machine room as defined in the preamble of claim 8.

In the case of traction sheave elevators, the machine room is conventionally placed in a separate space above the elevator shaft. The elevator ropes are passed into the shaft via traction and diverting pulleys provided in the machine room. The machine room contains a drive motor, possibly a gear system connected to it, and the equipment for the supply of power and control of the motor. During installation, the various pieces of equipment are mounted in specific locations in the machine room according to the requirements of the elevator construction. Alternatively, the elevator machinery is pre-installed on a base which is then placed on top of the elevator shaft, whereupon the positions of the various parts of the machinery are adjusted more accurately.

The installation of the machine room equipment in the machine room comprises several operations which are laborious and time-consuming to carry out on site. The base of the hoisting motor and the traction sheave have to be mounted in place and their positions adjusted using a plumb line. The vibration dampers and insulations have to be mounted and adjusted. In addition, an overspeed governor and a control unit are installed in the machine room. The hoisting motor and the overspeed governor are connected to the control unit. The cabling for the elevator car and shaft are installed and passed into the shaft. A wooden locator is made for the plumb lines of the shaft. Furthermore, the ropes are mounted and the functions of the elevator are adjusted. Due to the circumstances, it is difficult to achieve a good installation result. Moreover, skilled persons of several different specialties are needed for the installation of the various components.

Various elevator shafts of modular construction are also known in the art. In these solutions, the machine room consists of a shaft module mounted on top of the elevator shaft. Such modules are not suited for elevator shafts built separately on site, because the shaft wall dimensions are not sufficiently accurate.

The object of the present invention is to achieve a new machine room construction for an elevator as well as a new installation arrangement. To implement this, the arrangement of the invention is characterized by the features presented in the characterization part of claim 1. Similarly, the procedure of the invention is characterized by the features presented in the characterization part of claim 8. Other preferred embodiments of the invention are defined in the subclaims.

By using the arrangement and installation procedure of the invention, the machine room can be quickly and accurately positioned on site. The base of the machine room as well as the holes needed in it for the hoisting ropes and other components extending into the shaft can be prefabricated and made to more accurate dimensions. The tests, wiring and adjustments, performed in a protected factory environment, are carried out more accurately. On-site adjustments are limited to a minimum.

The elevator can be taken into use soon after it has been brought to the building site. The boundary between the elevator supplier and the building contractor becomes clearer. Deviations in the dimensions of the elevator shaft are not important, but the base allows relatively large variations.

In modular machine room constructions containing the walls of the room as well, a compact structure is achieved and the sound insulation can be further improved.

The invention is described by the aid of some of its preferred embodiments by referring to the drawings, in which

- Fig. 1 presents a perspective view of a module according to the invention,
- Fig. 2 presents the machine room module of the invention in different stages of installation,
- Fig. 3 presents another perspective view of a module according to the invention, and
- Fig. 4 presents a fourth module according to the invention.

Fig. 1 shows a machine room module 1 according to the invention, comprising a base 2 with a hoisting machinery 4 mounted on supporting rails 6. The hoisting machinery comprises at least a motor 8, a gear system 10 and a traction sheave 12 attached to it. The hoisting ropes 13 running over the traction sheave are passed further via a diverting pulley 14 mounted on the base. The base 2 is provided with mounting bases 16 and 18 for the control unit and the overspeed governor and other necessary equipment to be installed in the machine room. The frame of the base 2 is manufactured from steel rails 20 to which a floor 22 is attached. The floor consists of an acoustic panel with a surface of a material strong enough to be stepped on, e.g. perforated steel plate. The floor structure may vary greatly as long as it meets the requirements regarding noise damping and installation and maintenance work. Mounted on the steel rails forming the frame are upper insulators 24 bearing the supporting rails 6 of the hoisting machinery. The insulators are made of e.g. polyurethane.

The frame of the base 2 is mounted on top of the top module 26 forming the topmost part of the elevator shaft. The top module 26 consists of a

steel frame of a size essentially corresponding to the cross-section of the elevator shaft, comprising an upper and a lower frame 28 and 30 and vertical supports 32 connecting them and the required diagonal braces 33. Fitted on the lower edges of the top module are lower insulators 36, which are likewise e.g. polyurethane insulators. Via these insulators, the machine room module is supported by the topmost floor beside the elevator shaft of the building. Thus, the top module forms the topmost part of the elevator shaft. In this embodiment, the frame of the base, the top module with its supporting structures and the insulators form the supporting elements of the machine room module. Moreover, the supporting elements are provided with height adjusting elements 37 fitted on top of the insulators to permit adjustment of possible irregularities in the upper edges of the shaft walls.

The base is provided with points of attachment for plumb lines 38, and the plumb lines are preferably fastened beforehand to these points to permit adjustment of the position of the base. Mounted on the lower edges of the top module 26 are adjustable lateral supports 34 designed to hold the machine room module laterally in place, attaching it to the walls of the elevator shaft. The wall surfaces of the top module consist of acoustic panels 29.

Fig. 2 illustrates the installation of a machine room module 1 according to the invention on top of an elevator shaft 40. The base of the machine room module is provided with fixing points 42 for a hoisting cable to support the module when it is being lowered onto the shaft (Fig. 2a) and positioned. The plumb lines 38 are passed down into the shaft 40 and their distances from the shaft walls 44 are measured (Fig. 2b). The position of the module is checked and adjusted to bring the module to its final position by moving it by means of the hoisting apparatus (Fig. 2c). Finally, the module is fastened to the walls 44 of the elevator shaft by moving the lateral supports 34. Insulators 46 are fitted between the shaft walls 44 and the lateral supports 34 to maintain the level of insulation of the machine room module.

In a preferred embodiment of the invention, the machine room module is provided with side walls 48 and a ceiling 49 as indicated by the broken lines in Fig. 2.

Fig. 3 shows another construction according to the invention and uses the same reference numbers as Fig. 1 to indicate corresponding parts. Attached to the underside of the steel rails of the base are plates 45 forming an additional mass and below them insulators 36 which rest on the upper edges of the shaft walls 44. The additional mass is designed in the first place to improve the insulation structure between the machine room module and the shaft walls 44. The elevator shaft has been built to its full height, in which case the base is supported directly by the upper edges of the shaft walls. In this embodiment, the steel rails of the base frame together with the insulators constitute supporting elements by which the machine room module is supported on the top part of the walls of the elevator shaft.

The solid structure between the upper 24 and lower 36 insulators and the base frame together with or without a top module constitute an advantageous double insulation structure which has good noise damping characteristics. Although the insulators in the above example are fitted between the top edges of the shaft walls and the machine room module, they can as well be placed between parts of the machine room module, in which case the machine room module rests directly on the top edge of the walls. The machine room module may also be secured with fixing elements such as bolts to the walls of the elevator shaft instead of just resting gravitationally on the walls.

Fig. 4 presents yet another embodiment of the invention. The base 50 of the machine room module is placed above the elevator machinery. In a way, the hoisting motor 8, gear 10 and the traction sheave 12 of the elevator as well as the diverting pulley 14 hang down from the base. Via vertical module walls 52, the base 50 is supported by the top edge 54 of the shaft walls 44. Insulators 56 are provided between the module walls and the base and between the module walls and the shaft walls.

To maintain a sufficient level of insulation, the hoisting motor and the gear system are isolated from the rest of the machine room space by means of protective plates 58, which can be removed or opened for servicing. The control unit 58 is attached to the module walls 52. Mounted in the top part of the elevator shaft is a plate or support which can be turned across the shaft so as to form a servicing platform. The servicing platform consists of a supporting part 62 whose one end 66 is attached to a shaft wall 4 and whose other end 68 rests on the topmost floor 64 served by the elevator. Turnably attached to the support 62 is the platform 60 itself, whose other edge is supported by a wall 44 of the elevator shaft. During servicing, the platform 60 is in a substantially horizontal position. During normal operation of the elevator, this structure lies flat against the shaft wall or is removed altogether.

In the above, the invention has been described by the aid of some of its embodiments. However, the invention is not to be regarded as restricting the sphere of protection of the invention, but the embodiments of the invention may vary within the limits defined by the claims.

Claims

1. Machine room module for an elevator, comprising at least a base (2) carrying at least the hoisting machinery of the elevator, said machinery including a traction sheave (12) and a motor (8), **characterized** in that the various pieces of equipment carried by the base (2) are fixedly mounted in appropriate positions according to the requirements of the elevator construction and that the base (2) is provided at least with supporting elements (20,36) to support the base and to fix it on top of the elevator shaft (40) and with positioning devices (38) for positioning the module in the correct place in a horizontal plane above the shaft (40).

2. Machine room module for an elevator according to claim 1, **characterized** in that, to allow adjustment of the vertical position, the module comprises height adjusting elements (37) mounted in conjuntion with the supporting elements (20,36).

3. Machine room module for an elevator according to claim 1 or 2, **characterized** in that the supporting elements (20,36) comprise insulators (36) placed between the base (2) and the shaft walls (44) and that the base is provided with lateral supports (34) with insulators (46) to attach the base to the walls (44) of the elevator shaft.

4. Machine room module for an elevator according to any one of claims 1 - 3, **characterized** in that the supporting elements comprise a frame part (20) and insulators (36) and that the module has vertical walls mounted between said frame part and insulators, said vertical walls forming the top part of the shaft.

5. Arrangement according to any one of claims 1 - 4, **characterized** in that the machine room equipment is fixed to the underside of the base (50) and that the drive machinery (8,10,12) is isolated from the shaft space by means of an insulating wall (58).

6. Arrangement according to claim 5, **characterized** in that it comprises a servicing platform (60,62) so mounted that it can be turned into a horizontal position, said platform being placed in the top part of the shaft.

7. Arrangement according to claim 1, **characterized** in that the base can be provided with walls (48) and a covering (49) which are attached around it so as to form the walls and ceiling, respectively, of the machine room.

8. Procedure for installing the machine room of an elevator, said machine room comprising at least a base (2) and an elevator drive machinery including at least a hoisting apparatus with a traction sheave (12) and a motor (8), **characterized** in that the base (2), on which the various parts of the drive machinery have been fixed in their final positions, is lifted onto the shaft (40), the base (2) is positioned on top of the shaft so that the parts of the drive machinery come to the correct positions relative to the shaft (40) and the base is fixed to the shaft.

9. Installation procedure according to claim 8, **characterized** in that the base (2) is attached to the shaft walls (44) so as to keep it in place in a horizontal plane.

10. Installation procedure according to claim 8, **characterized** in that an elevator car and/or counterweight linked to the drive machinery by a hoisting rope (13) is lifted simultaneously with the base (2).

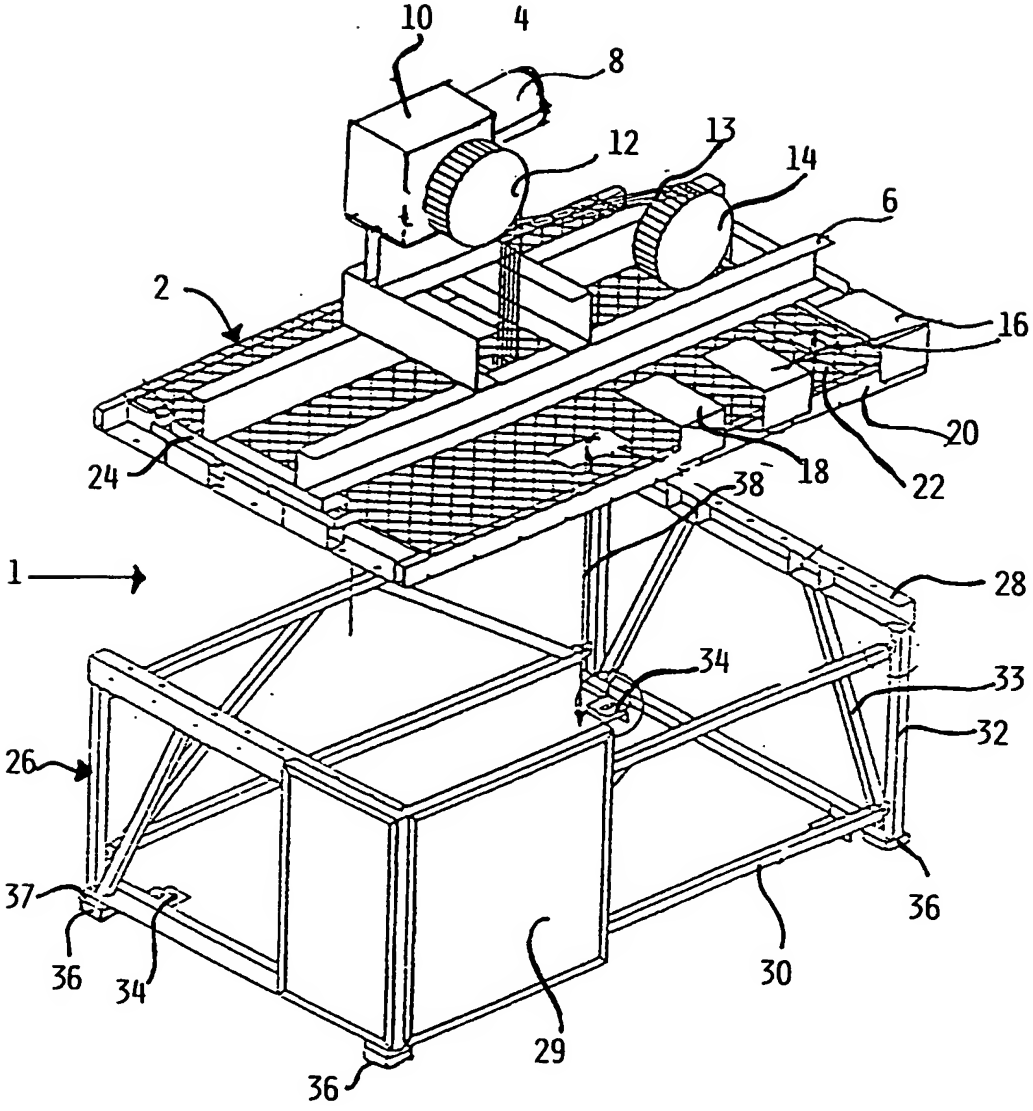

FIG. 1

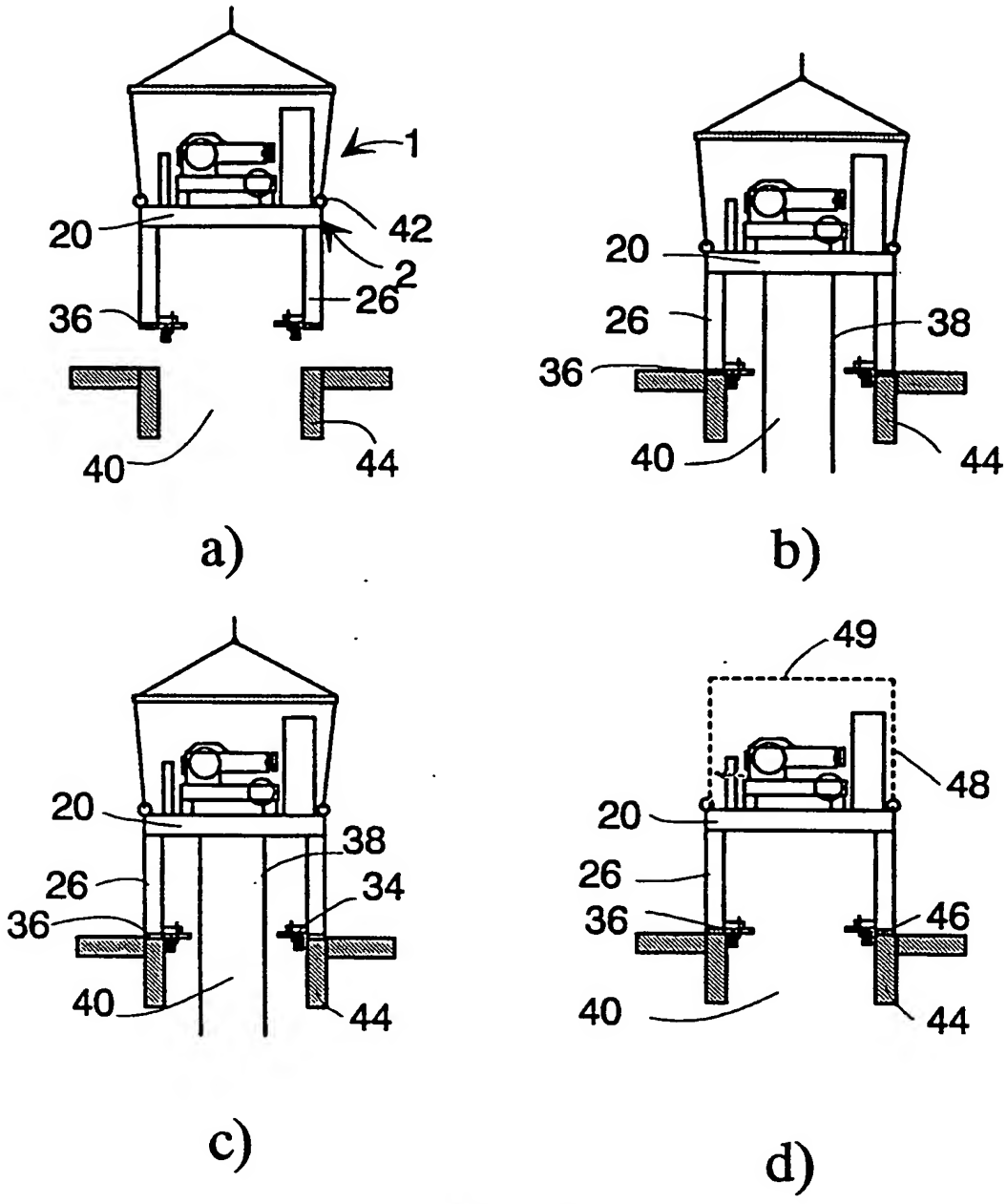
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Fig. 2

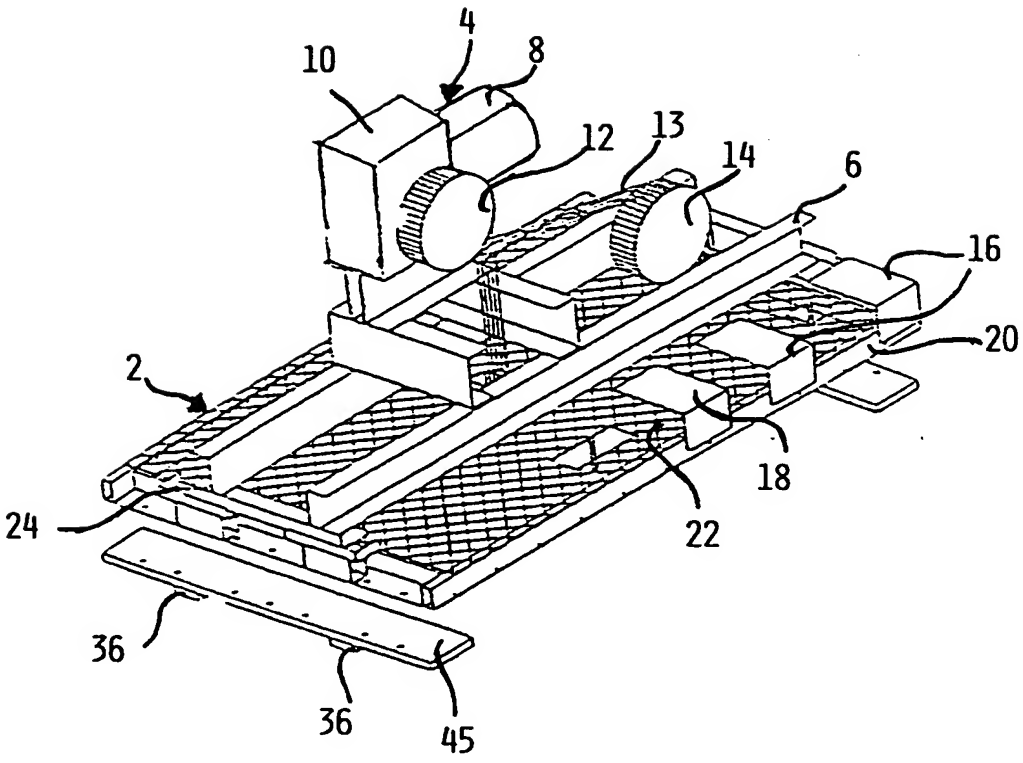

FIG. 3

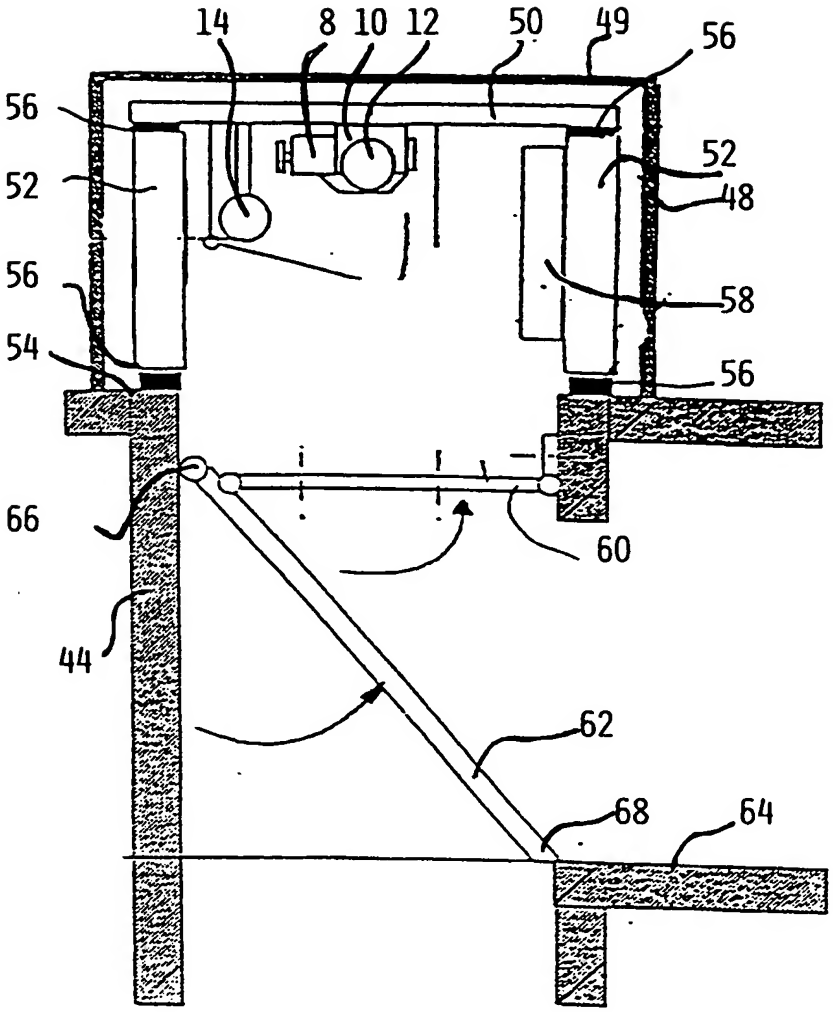

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 5604

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
P,X	PATENT ABSTRACTS OF JAPAN vol. 18, no. 224 (M-1596) 22 April 1994 & JP-A-06 016 363 (MITSUBISHI ELECTRIC CORP) 25 January 1994 * abstract *	1,8,9	B66B11/00
X	US-A-3 519 101 (J. E. SIEFFERT) * column 3, line 30 - line 43 * * column 5, line 26 - line 51 * * column 7, line 1 - line 25 * * figures 1,4 *	8-10	
A		1,2,10	
A	US-A-5 033 586 (RICHARDS ET AL.) * abstract * * column 3, line 41 - line 54 * * figure 1 *	1,4,5, 7-10	
A	EP-A-0 019 066 (INVENTIO AG) * page 3, line 1 - line 7 * * figure 2 *	1-3	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 16, no. 206 (M-1248) 15 May 1992 & JP-A-04 032 478 (TOSHIBA SHIYOUKOUKI SAABISU KK) 4 February 1992 * abstract *	1,8-10	B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 November 1994	Salvador, D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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